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ABSTRACT

The findings of a comprehensive review of the literature concerning reading instruction at the postelementary level are presented in this report. The report first summarizes literature dealing with the perceived decline in reading achievement. Next, it reviews current instructional programs and suggestions for their improvement that have been made by reading and content area educators, and finally, it presents recommendations for the improvement of reading instruction at the postelementary level. (Author/FL)

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Technical Report No. 518

READING INSTRUCTIONS IN POSTELEMENTARY SCHOOLS: REVIEW AND COMMENT

by

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Report from the Project on
Studies in Language: Reading and Communication

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Abstract

This report summarizes the finding of a comprehensive review of the literature concerning reading instruction at the postelementary level. First, sources describing the perceived decline in reading achievement are summarized. Then literature describing postelementary reading programs and practices is reviewed. Evaluations of programs and suggestions for improving reading instruction at the postelementary level are included. Journals published by educators in reading and in the content areas of English, science, social studies, mathematics, and vocational-technical education as well as texts and published guidebooks related to reading program development were the source material for this report.

Reports of high school graduates who lack reading proficiency have been a cause of concern for the nation's public. Many lay people and educators blame the postelementary schools for this poor achievement, believing that the schools are doing an inadequate job of instruction. One purpose of this review is to identify sources in the literature which would help clarify the issue of poor reading achievement by today's students. A second and major purpose is to examine the literature describing current practices and procedures for teaching reading in order to understand the current status of reading instruction at the postelementary level, and to gain a perspective on what is needed to improve the reading achievement of high school graduates. The first portion of this review summarizes literature dealing with the perceived decline in reading achievement. Next, instructional programs and suggestions described by reading and content educators are reviewed and, finally, recommendations are given for the improvement of reading instruction at the postelementary level.

I

The Perceived Decline in Reading Achievement

Both the general public and educators have expressed concern about the reading performance of students who graduate from the nation's public schools. Reports of high school graduates who lack reading proficiency have been publicized in widely read magazines

such as Newsweek and U.S. News and World Reports. Many college spokesmen maintain that colleges now need to offer basic courses in reading and study skills to incoming freshmen (Baum, 1976). Several high school graduates have sued their local school boards for negligence, claiming the schools did not provide adequate reading instruction (Strike, 1977). These and similar examples of students who graduate from high school with reading deficiencies plus the much publicized reports of declines in students' scores on achievement and aptitude tests have led a large portion of the general public to conclude that poor reading and generally low achievement are widespread problems and that the nation's schools are not providing adequate instruction (Strike, 1977; Walker, 1977).

Cawelti (1977), Chall (1979), Ferguson (1976), and Walker (1977) indicate that public opinion has had a great impact on the issues related to the perceived decline in reading and general achievement. But Cawelti (1977), Spady (1977), and Walker (1977) claim that this public involvement has, in many cases, served to oversimplify and misrepresent the problem of poor reading and low achievement. As the following portion of this section of this review demonstrates, there is evidence to show that the decline in achievement and aptitude test scores does not simply mean today's students have less ability and have acquired fewer skills than students who took these tests a decade ago, as many in the general public would believe.

Ferguson (1976) reports that while there has been a steady decline in average scores on the American College Test (ACT), the

percentage of high scoring students has remained the same. The percentage of low scoring students has increased, however. Ferguson (1976) suggests that a possible explanation for this increase in low scoring students is that the population now taking the ACT is more heterogeneous and includes more low-scoring women and more students from families with low incomes. Harris (1976) indicates that average scores on the Scholastic Aptitude Test (SAT) have also declined over the last 10 to 15 years. Unlike the ACT results, where the percentage of high scoring students remained the same, the frequency of high scores declined on the SAT. Like the ACT results, the percentage of low scoring students on the SAT increased. According to Harris it is doubtful that an increase in women and minorities taking the SAT accounts for this decline. Harris does cite evidence, though, to support the notion that increases in the number of low socioeconomic status (SES) students taking the SAT could, in part, be responsible for lower average scores. Harnischfeger and Wiley (1976) suggest that changes in the population taking a test may also partly account for the reported declines on such tests as the Iowa Test of Basic Skills (ITBA), the Comprehensive Test of Basic Skills (CTBS), and the National Assessment of Educational Progress (NAEP). According to Harnischfeger and Wiley (1976) there has been a sharp decline in the pupil dropout rate in grades 5 through 12 since 1950. This implies that more former dropouts who were typically low achievers are now taking tests like the ITBS, CTBS, and NAEP, thus lowering the average scores. Sapone and Guiliano (1976) list 19 possible reasons

for declining test scores. Changes in the test-taking population similar to those suggested by Ferguson (1976) and Harris (1976) were some of the reasons Sapone and Guiliano listed, but additional reasons included increased drug abuse by students, increased television ownership, curricular and organizational changes within schools and school districts, increased teacher mobility, and large increases in the proportion of working mothers.

Shane (1977) reports on an interview he conducted with Willard Wirtz, chairman of the College Entrance Examination Board's (CEEB) panel on SAT score declines. During this interview, Wirtz discussed explanations suggested by the panel for the decline of SAT scores, as well as declines after grade four on other standardized tests such as the ITBS, CTBS, and NAEP. According to Wirtz, one explanation for the decline after grade four was that instruction is less effective or inadequate at the higher grades. This explanation appears to have been readily accepted by the general public. A second explanation was that achievement and aptitude tests may not be as relevant for the later grades as they are for earlier grades. Wirtz, like Harnischfeger and Wiley (1976), also indicated that increased retention rates in schools could be partly responsible for the decline in test scores in later grades. Wirtz stated that the CEEB panel found that students in the first four grades represent the same cross section today that they did 10 to 15 years ago. However, three-quarters of all students in the 15 to 17 year age group are now enrolled in school, whereas 12 to 15 years ago only about

two-thirds of this age group stayed in school. Wirtz also suggested that the relaxed standards and social unrest of the late sixties and early seventies, changes in family living, and the impact of television also played a part in the decline of test scores. Wirtz indicated that according to the CEEB panel report, between two-thirds and three-fourths of the academic score decline was attributed to changes in the test-taking population. He further commented that the educational structures in the United States were not able to keep up with changes in students, families, and society.

Acland (1976), Brown (1977), Cawelti (1977), Spady (1977), and Walker (1977) maintain it is unfortunate public pressure led to such proposed solutions to test score decline as competency testing, minimum competency requirements for graduation, competency based education, and the back-to-the-basics movement. Cawelti (1977) suggests that arbitrary requirements will further alienate disadvantaged youth. According to Walker (1977), it will be impossible to establish minimum standards that are fair to students with different backgrounds without creating an inequitable, chaotic system. Acland (1976) predicts "that teachers will respond to proficiency tests for high school graduation by teaching a dreary list of skills....For students this will be another senseless school ritual." (p. 29) Brown (1977) believes stressing basics such as the 3 R's will result in neglect of other essential subjects such as the humanities, foreign language, and social and natural sciences. Acland (1976), Brown (1977), Cawelti (1977), and Walker (1977) all echo Spady's (1977)

conclusion that real improvement in the nation's educational system will require careful reconsideration of current instructional programs rather than such quickly formulated solutions as minimum standards and competency based education.

The available evidence shows there is indeed a decline in reading and general achievement scores, particularly at the higher grade levels. Although many members of the general public believe the reason for this decline is inadequate instruction at the secondary level, the findings of Ferguson (1976), Harris (1976), and the CEEB panel on SAT score decline suggest that changes in the test-taking population are a more likely cause. Pressure from the general public has provided the impetus for the back-to-the-basics movement and for the establishment of minimum standards and competency based testing and education as solutions to the problem of test score decline. However, educators such as Carwelti (1977), Spady (1977), and Walker (1977) recommend that a careful appraisal of present instructional programs needs to be done before workable solutions can be devised.

II

Postelementary Reading Programs and Practices

The following review of the literature is our attempt to appraise the present status of reading instruction at the postelementary level. Professional journals in reading and in the content areas of English, science, social studies, mathematics, and vocational-technical educations were reviewed as well as texts and published guidebooks related to reading program development. Many of these sources describe programs already in operation, while others make suggestions for future programs.

Many reading educators (Aukerman, 1972; Early, 1960, 1979, 1973; Estes & Staiger, 1973; Herber, 1970; Karlin, 1977; and Strang, McCullough, & Traxler, 1967) readily agree that reading instruction at the postelementary level should be carried out through a developmental program that reaches all students in their content area courses. The fact is, however, that reading instruction is often carried out through separately organized reading classes. Therefore, the following review of programs and practices deals separately with special reading classes and with developmental teaching in content area classes.

Reading Classes

Hill (1971) reviewed 25 surveys of secondary reading activity which were published between 1942 and 1970. According to Hill's summary table, planned reading instruction at the postelementary level most often took place in a developmental, corrective, or

remedial class, or was considered part of an English class. However, Hill concluded that surveys of reading activity conducted prior to 1970 were poorly designed and did not accurately guage the type and quality of reading instruction offered in the nation's public schools.

Freed (1972) reported the results of a comprehensive survey of reading instruction in postelementary schools. This survey of 242 school systems across the 50 states was conducted in fall 1971. According to Freed, 55% of the junior high schools and 22% of the senior high schools reported that their instructional program included a required reading course. The type of course required was developmental in 21% of the cases and remedial in 18% of the cases. Of the remaining school systems (those not requiring a reading course), 49% reported they did provide developmental or remedial courses for students who elected them. In the same report, Freed summarized the responses of 41 of the 50 state departments of education to questions about the type of secondary reading program(s), if any, they recommended. Five states (14%) indicated they made no recommendation regarding specific programs. Of the states recommending reading programs, 89% favored developmental reading, usually in conjunction with remedial or corrective programs. Only one state recommended teaching reading skills related to specific content areas. Hill (1975) conducted a survey of secondary reading activity in the western New York region. According to Hill, the 172 schools sampled were representative of the U.S. population. Hill found that 81% of the public schools reported reading programs in operation. The

forms or types of reading activity had the following frequencies: corrective classes (78%), remedial reading (74%), developmental classes (68%), content oriented (41%), and disadvantaged (35%).

Early (1969) reviewed research concerning successful reading programs at the secondary level. She concluded that when reading instruction was part of a postelementary school's curriculum, the emphasis was on remedial, corrective, or special classes for the disabled, rather than on developmental programs taught through content courses. Like Hill (1971), Early also commented that research concerning the specific kinds of reading instruction and the effectiveness of particular reading programs was limited both in quality and quantity. Therefore, Early relied upon descriptive articles for her review. The following two paragraphs summarize the kinds of activities and procedures Early identified as typical of reading classes at the postelementary level between 1959 and 1969.

Early (1969) reported that some of the reading classes labeled "developmental," were elective, others were required for a semester or an 8-week period. The main purpose of these developmental classes was to increase the amount and quality of voluntary reading. Often the classes included laboratory periods where students used a variety of workbooks, textbooks, teacher-developed exercises, pacers, tachistoscopes, and published kits of exercises. Typically, the instruction focused on vocabulary development, study techniques such as Survey, question, read, rite, review (SQ3R), and specific skills such as comprehension of main ideas and identification of supporting details.

Early (1969) reported that the terms remedial and corrective are used loosely and interchangeably in the literature to describe classes for disabled readers at the postelementary level. These classes are usually offered in a clinic or lab setting and are for students reading below grade level for a variety of reasons, including cultural deprivation and delinquency. The instruction in these remedial/corrective labs and classes is usually based on a thorough diagnosis of the reading problem and involves a more flexible usage of the same kinds of methods used to teach developmental reading.

On the basis of a later, informal review of secondary reading instruction, Early (1973) concluded that the reading class continues to be one of the major vehicles for teaching reading at the post-elementary level. However, she indicates the content and format of these reading courses have undergone changes since her 1969 review. For example, more of the reading courses are elective, short term, and cover one specific area such as study skills, vocabulary development, or speed reading. Early's observation that reading courses have become more varied is supported by others. Larsen and Guttenger (1979) describe a secondary reading course structured around the developmental tasks of youth. The course includes intensive testing and the development of an individual reading improvement plan, after which the students are helped to improve through individualized instruction in reading labs. Kintisch (1979) describes a reading course designed to help students improve their scores on the SAT test. This course stresses the efficient use of time, the ability

to respond to multiple choice questions, and the reduction of test anxiety. Frankel (1975) provides a number of suggestions for creating learning centers within reading classes at the junior high level. According to Frankel, stocking the center with a variety of activities that will occupy the majority of the class enables the teacher to work with individuals or small groups.

Based on our review of the literature, the reading class appears to be an important mode of reading instruction at the postelementary level. These classes are usually labeled developmental or corrective; however, the content and organization differ as schools and teachers have adapted the reading class format to meet a variety of student needs. Some educators, such as Palmer (1975), imply that the existence of special reading services, such as reading classes, leads content teachers to assume that reading instruction is not their responsibility. Others, such as Kirby (1978), maintain that reading skills taught in isolation do not contribute to a student's ability to read content material. However, Early (1973) describes a number of instances where skills taught in a reading class are readily applicable to content reading. Although there is no reliable evidence to indicate how the existence of reading classes affect content area reading programs, the following section demonstrates that the prevalence of reading classes has not precluded interest in content area reading. Many content specialists have put much effort into developing and using methods and materials designed to teach the reading skills necessary for their courses.

Reading in the Content Areas: Instructional Suggestions from Content Educators

When content-area teachers find a particular technique or instuctional practice to be successful, they often describe it in a journal or other publication related specifically to their content field. The review that follows summarizes reading-related activities that have been described by educators in the area of social studies, English, science, mathematics, industrial arts, home economics, and business education.

Social studies. For the past few years the major publication of the National Council for the Social Studies (NCSS), entitled Social Education, has included at least one article per year indicating how the teaching of reading can improve the learning of social studies content. Recently, increased attention to the reading/social studies relationship has become apparent. The theme of the January 1978 issue of Social Education was "Improving Reading in the Social Studies" and a chapter of the 47th Yearbook (1977) for NCSS dealt with "Reading in the Social Studies" as it affected the yearbook theme of developing decision-making skills. The most recent indication of increased interest in the subject was a joint publication of the ERIC Clearinghouse for Social Studies/Social Science Education, the ERIC Clearinghouse on Reading and Communication Skills, the International Reading Association, and the Social Science Education Consortium, Inc. This publication, Teaching Reading in the Social Studies, was published in June 1978. All of these publications are

readily available to social studies teachers who have joined their professional organization.

O'Connor (1967) was one of the first to say why social studies teachers should be concerned with reading skills: "Most often... when a pupil is categorized as a slow learner, what is really meant is that he is a slow reader." (p. 104) O'Connor urged social studies teachers to accept the idea that "basic social studies skills are reading skills" and skills learning depends on active skills teaching accompanied by numerous planned practice opportunities. Practice, he maintained, is necessary for the more able students as well as the less able. After offering suggestions for specific activities that teachers should carry out in their classrooms, O'Connor concluded: "There is no doubt that, if reading improvement is going to take place, social studies teachers are going to be the primary source of the improvement." (p. 107)

Ten years later, when "back to the basics" was being heard throughout the land Beyer (1977) reiterated some of O'Connor's thoughts with more current terminology:

> Teachers can and should teach the basic skills of reading... within the context of the social studies content that they use. Such instruction will not only improve student performance in these basic skills, but will also certainly enhance student achievement in the areas of knowledge and affect associated with current social studies instruction. Teaching

> basic skills in coordination with teaching about social studies content should be a common practice in our classrooms. (p. 89)

Emphasizing that teachers must recognize the "mutual interaction of skills and content" Beyer offered specific suggestions, with examples, for activities teachers could use to emphasize reading skills in their classes.

Lunstrum (1976) reviewed reading related research with implications for social studies instruction. He concluded that the reading problem in social studies is multifaceted:

There is no reliable assessment measure to identify the specific reading abilities of students.

What is interpreted as inattention or indifference on the part of teachers is actually a lack of understanding of the reading difficulties of students.

Publishers appear to be indifferent to the problems of readability, so a range of readability levels often exists within a given text.

The concept load in most reading assignments, even those at an approximately correct reading level, tends to be extremely heavy.

Lunstrum suggested directions for more meaningful reading research related to the social studies and called for inservice training of "social studies practitioners /who/ appear poorly informed about the reading process and content-related reading problems." (p. 16)

More specific suggestions for actual classroom practice were offered in the January 1978 issue of Social Education which featured reading as its theme. Rowell (1978) discussed the close relationship between vocabulary development and concept development. He pointed out that while it is important for teachers to emphasize specific words as a product of vocabulary instruction, they must also emphasize techniques for learning still other words, that is, the process of vocabulary development. Fernald, Lott, and Lunstrum (1978) discussed activities that should precede a reading assignment, while Rader (1978) gave examples of activities designed to improve critical reading skills. Lott (1978) discussed the merits of language-experience instruction for the social studies classroom. An illustration of Herber's "Three Levels Construct" (Herber, 1970) for improving the comprehension of history materials was offered by Hash and Bailey (1978). Cline and Taylor (1978) discussed ways of improving student attitudes about reading.

In Developing Decision-Making Skills, the 47th Yearbook of the National Council for the Social Studies, Lunstrum (1977) tied everything together for members of that organization. Acknowledging that curricular reforms of the last decade had created "a new social studies with a more sophisticated conceptual structure," Lunstrum stressed the increased need for teachers to recognize that "skills in reading are an integral part of the decision-making process." He discussed the conditions affecting the status of reading in the social studies and identified reading skills he sees as essential for learning in

the social studies. Recognizing that teachers need both suggestions for instructional strategies and appropriate assessment strategies, he offered both. The examples and illustrations offered can serve as a valuable resource for the social studies teacher.

Lunstrum and Taylor (1978), in their monograph published jointly by four professional organizations, address themselves to three major themes: (a) matching abilities and resources, (b) improving motivation to read, and (c) improving reading comprehension. The authors state that they are..."not advocating that social studies learning be replaced by reading instruction, but they do believe that reading problems can, at times, be attacked effectively during social studies instruction." (p. 10) In addition, they..."believe that, in spite of the pressing demands on their time...teachers can make contributions to student reading improvement at the same time they are teaching social studies." (p. 11) The monograph is laced with practical, timely examples showing precisely how this can be done.

The social studies educators cited in this review are concerned about many aspects of reading instruction. They realize the importance of reading skill to the attainment of the basic knowledge, the concepts, and the affective behaviors associated with the social studies. Based on this realization, social studies educators have developed materials and methods of teaching to improve learning from reading. Although it was not surprising that English educators were also very involved in the reading-related aspects of their classes, we found it interesting to note how the concerns and areas of emphasis differed between English and social studies teachers.

English. A survey of the journals (Language Arts, English Journal, and Research in the Teaching of English) published by the National Council of the Teachers of English (NCTE) from 1973-1979 shows that each journal contains many articles or even entire sections dealing with some aspect of reading instruction in English class. A large number of articles in these NCTE journals offer suggestions for stimulating student interest in reading. Though some articles deal with the interest of students at all reading ability levels, many articles describe activites for motivating the poor or reluctant reader. For example, Barmore and Morse (1977) describe how an English teacher might help students develop a positive attitude toward reading by creating an atmosphere where students feel secure enough to share their reading interests and reactions to reading. LaRoque (1976) suggests that English teachers slow down the pace of their classes so students have time to savor and enjoy what they read and, thus, begin to see reading as a pleasurable leisure time activity. Peters (1974) suggests that English teachers tape entire stories and paperback books for poor readers so they can listen, read along, and get the sense of a complete story. Other authors stress the importance of selecting material that is meaningful for particular students (Pietras, 1976) and of providing direction for student reading (Palmer, 1976). The application of psycholinguistic insights into the reading process (Goodman, 1974), the use of story dramatization (Wertheimer, 1974), and interest inventories

(Lamburg, 1977) are some of the other numerous suggestions made by English teachers for the purpose of stimulating student interest in reading.

Many English educators also presented ideas designed to help students understand literature. Yesner (1976) urges teachers to be aware that students' responses to literature are based on the students' own unique experiences with both their language and environment. Manzo (1973) suggests that readers write annotations to synthesize what they have read. Graves, Palmer, and Furniss (1976) provide examples of how to structure reading activities for English classes by using pre- and postreading activities as well as questions which are inserted into the reading selection itself.

An issue that surfaced in a number of NCTE journal articles was whether the English teacher or the reading teacher was the more qualified to teach reading at the postelementary level. A number of articles implied that the English teacher had more to offer than the reading teacher or reading specialist. For example, Palmer (1974) emphatically states, "Many seemingly ideal reading specialists are ripping-off students on a daily basis, primarily because they are omitting the very language and process-centered learning activities that reading desperately needs" (p. 40). According to Palmer, typical approaches used by secondary reading teachers and specialists center around "practicing isolated skills in contrived materials" and encouraging students to read more. Kirby (1978) supports Palmer's position by describing the approaches used by reading professionals

as isolated skills training. However, Roberts (1978) believes that "the English teacher and the reading teacher can join forces to make high school students' literary experiences more meaningful, more profitable, perhaps even more pleasurable..." (p. 56) Roberts suggests that the reading teacher, with knowledge of the reading process, can identify and help the English teacher to teach the skills necessary for reading all types of literary genre. Roberts also maintains that reading teachers have developed methods of questioning and approaches to the constructing study guides that would be useful to English teachers.

English teachers have developed many activities designed to encourage their students to read and there is little question that many English teachers are well qualified to teach the reading skills necessary to read the narrative types of materials used in most of their classes. However, when some English educators imply they are more qualified to teach postelementary reading than reading specialists, one wonders if these English educators are aware of the expository nature of the materials characterisitc of such courses as social studies and science.

Science. The Journal of Research in Science Teaching, Science Education, The Science Teacher, and School Science and Math were reviewed to gain perspective on how science educators view reading in the science class. Many of the reading-related articles in these journals described how science materials and questions about the materials could be adapted to improve readability and comprehension.

Doran and Sheard (1974) describe a textbook analysis form they developed to assess the readability, content, mathematical demands, teaching aids, and several other aspects of science texts to help teachers select textbooks appropriate for their students. Toole and Bedford (1969) describe how the Dale-Chall readability formula could be adapted for use with science texts. Hartford and Good (1976), and Ricker (1978) maintain that readability formulas such as the Dale-Chall, the Fry, and the Fog cannot accurately measure the difficulty of science materials because these formulas do not consider the concept load and cognitive requirements for reading science materials. Ricker suggests that teachers consider such factors as concepts covered, writing style, and number and difficulty of charts and graphs as part of the readability assessment of a text. Hartford and Good (1976) presented schema for evaluating the cognitive development needed by students to understand particular instructional materials. Corey (1977) rewrote scientific journal articles by substituting equivalent and more understandable terms for technical vocabulary and by providing in-text definitions. He found that ninth graders who read the journal articles with the modified vocabulary scored higher on a multiple-choice comprehension test than a control group that read the articles as they appeared in scientific journals. Lowery and Leonard (1971) describe the development of an instrument designed to assess textbook questioning style and the science/learning processes used by authors of textbooks. In a second article published in 1973, Lowery and Leonard reported how they used this instrument

to evaluate biology texts. They found significant differences in the types of questions asked. For example, some texts used more direct or factual information questions while others used more "higher-order" (valuing and open-ended) questions. Lowery and Leonard concluded that the analysis of questions is a legitimate basis for textbook evaluation. Based on their research, Koran and Koran (1973), Knapp (1976), and Santiesteban and Koran (1977) recommended that science material be adapted for students by including adjunct aids such as advance organizers, annotations, and interspersed questions. These authors strongly support the use of textual aids that help learners focus on the relevant aspects of written communication.

In addition to evaluation of procedures for modifying science materials, a number of other topics are discussed in science education journals and related publications. Several authors describe ways of teaching students how to more effectively read science material. Davis (1978) suggests that science teachers first identify and then teach the skills necessary for reading science materials. She also suggests that science teachers teach their students how to use study plans such as SQ3R. Liebherr (1970) provides examples of prereading, reading, and postreading activities designed to improve comprehension of science materials for readers at all ability levels.

Rather than using reading as a means of learning about science, Carter and Simpson (1978) and Wellman (1978) maintain that science instruction can be used as a vehicle to teach reading. According

to these authors, science taught with an emphasis on inquiry and process helps develop intellectual skills that will transfer to learning to read.

Several surveys of science educators concerns were also reported in the science education literature. The 1977 National Survey of Science, Mathematics, and Social Studies Education (Weise, 1978) and a survey of middle and junior high school teachers conducted by the National Science Teachers Association and published in the October issue of The Science Teacher, indicate that science teachers rank inadequate reading skills as a serious classroom problem. The majority of articles reviewed here indicate that science teachers emphasize analyzing and rewriting their materials to improve learning from reading. In contrast, many social studies and English educators deal with inadequate reading skills by developing special activities and teaching students various reading strategies.

Mathematics. Aiken (1977) points out that many students have problems reading the language of mathematics becasue,..."the names of mathematical objects usually have single denotations, adjectives are more important, and the grammar and syntax of mathematics are less flexible than those of ordinary English." (p. 251) According to Aiken, instruction in mathematics should emphasize careful reading and students should be taught how to translate English sentences into the special symbols of mathematics. Although Aiken indicates there is research evidence to show that instruction in reading the language of mathematics improves performance, few articles describing

methods and procedures appear in mathematics education journals. Hater, Kane, and Bryne (1974) suggest a number of methods for teaching mathematics reading skills to elementary students. These methods would perhaps be applicable at the postelementary level. Hater et al. suggest children be taught that mathematics is not always read from left to right. Often symbols are read from right to left, top to bottom, bottom to top, and in a combination of directions. Hater et al. stress that main ideas are often stated in the form of symbols and common words can take on different mathematical meanings. Hater et al. also make suggestions on how to help children read charts and graphs. Feeman (1973), like Hater et al. (1974), stresses his belief that children should be taught that mathematics is not read in the same left-to-right fashion as many other reading materials. He also indicates that children should be given exercises in mathematics symbol perception similar to the types of exercises given for letter and word perception. Dolgin (1977) maintains that secondary students may have problems with mathematics because they cannot deal with the dual language systems of traditionally written language and the symbolic language of mathematics. According to Dolgin, vocabulary should be taught by using actual models or pictures to give concrete illustrations of mathematical words. Dolgin also suggests students should be asked a variety of questions including literal, inferential, and critical questions to better comprehend the mathematical material they read.

We found few articles concerned with reading instruction in the mathematics education literature. Those we found and reviewed here, stressed the problems created because of the two symbolic systems. Some of the articles suggested that students in mathematics should be taught slow methodical reading habits and a number of articles stressed the importance of prereading/preassignment instructional activities.

Industrial arts, home economics, and business education. Ruskin (1966) and Aldridge, Church, Miasnik and Stewart (1978) suggest that industrial arts can be a vehicle for reading improvement for those students who are more interested in industrial arts than in academic areas such as English, science, or social studies. Aldridge et al. also maintain it is essential for the industrial arts teacher to select reading materials that students can understand and that will contribute to their success and satisfaction. Finally, Aldridge et al. state that no single method of developing reading and study skills is appropriate for all students. They indicate that the industrial arts teacher should expose students to a wide variety of reading and study strategies. Other industrial arts educators such as Feirer (1965) and Loewe (1970) make the point that reading and vocabulary instruction should be an important part of the industrial arts course, but they do not describe specific methods for accomplishing this.

The Illinois Teacher for Contemporary Roles was the only source of reading related publications for home economics educators that

was found for this review. In this journal, Spitze (1970) suggests that home economics content be presented by writing the material in simple language and at a level appropriate for slow readers. Spitze (1971) states that the curriculum content of home economics can be written on many reading levels and, therefore, taught in an individual manner. Included in Sptize's (1971) article is a form to be used for analyzing the content and format of low reading level materials. A bibliography of low reading level materials in consumer education is also include in The Illinois Teacher (Vander Jogt, 1971-72).

Business educators (Calhoun & Horner, 1975; Scott, 1975) maintain that the readability levels of many business education texts are too high for some students. These authors suggest that business education teachers should be prepared to teach difficult concepts prior to making reading assignments. Calhoun (1974) and Hanna (1974) describe methods of individualizing business education and accounting courses to meet the needs of students at different reading and ability levels.

The professional education journals for industrial arts, home economics, and business education publish few reading-related articles. The articles that do appear in the journals of these disciplines most often provide suggestions for adapting methods and materials for poor readers, since students who enroll in these vocational-technical courses often have poor academic skills.

Reading Instruction in the Content Areas: Instructional Suggestions from Reading Educators

Some reading educators have compiled their suggestions for

teaching reading in content classrooms into a textbook format. Other reading educators as well as subjects matter specialists, have shared their ideas in articles published in professional reading journals. The first part of this section summarizes suggestions given by reading educators in a textbook format. The second part summarizes general instructional suggestions published in professional reading journals. The final portion reviews suggestions for reading instruction in specific content areas.

Textbooks describing reading instruction in the content areas. Many reading educators are committed to the idea that reading instruction at the postelementary level should be carried out through content area courses. A number of these educators have written textbooks which include suggestions for developing programs for all content areas, as well as detailed descriptions of instructional practices for particular courses. These textbooks represent efforts to provide complete, comprehensive sources for content area reading instruction. The following portion of this review summarizes a representative sample of these texts and demonstrates that reading educators have provided a variety of suggestions for improving the reading performance of postelementary students.

Reading and Learning in the Content Classroom (Estes & Vaughan, 1978), begins with a discussion of how reading and learning are related. Estes and Vaughan then describe how to analyze material used in the content area classroom in terms of three factors: "1) the concepts presented in the material, 2) the language used to

convey those concepts, and 3) the skills needed by a reader to extract those concepts." (p. 19) Following these suggestions for evaluating materials, methods that could be used by the content area teacher to identify student reading needs are described. These methods include how to use standardized tests to diagnose student reading strengths and weaknesses, and informal methods to evaluate student attitudes toward reading and student use of study skills. Estes and Vaughan then explain how the information gained from evaluating students needs can be used to organize instruction. They recommend using prereading activities, study guides, and group discussions to help students learn from the material they read. Finally, 10 model lessons are provided to show how these activities and suggestions could be applied to a variety of content areas including English, science, social studies, mathematics, and vocational-technical courses.

Teaching Reading in High School: Improving Reading in Content Areas (Karlin, 1977), provides a description of the kinds of reading problems that occur at the high school level. Karlin recommends that secondary reading programs stress developmental reading taught through content area courses, but that they also include special classes where students with reading problems or students who want to improve their reading ability can receive individualized assistence. Karlin then explains that students' reading skills and attitudes are in a constant state of development and change. For this reason he recommends that content teachers continuously evaluate students' reading. Various formal and informal methods that can be used by

the content area teacher for this type of on-going evaluation are described in detail. General strategies for teaching content area reading such as teaching students how to survey material, set purposes for reading, and learn technical vocabulary, are provided before suggestions for teaching vocabulary, comprehension, and study skills in specific content areas are given. Karlin also includes some suggestions for promoting student appreciation and enjoyment of literature, as well as for individualizing reading instruction and working with the problem reader in the content area classroom.

Reading Strategies for Secondary School Teachers (Burmeister, 1974), and Teaching Reading in Secondary School Content Subjects: A Bookthinking Process (Smith, Smith, & Mikulecky, 1978) both include descriptions of the content area teacher's role in matching students' reading abilities and interests with appropriate reading materials. Burmeister (1974) explains that there is often a wide range in the reading abilities of students in a typical content area class. She then offers suggestions for evaluating the difficulty levels of materials and for evaluating student reading ability and interest. The second part of Burmeister's text includes descriptions of general teaching strategies, such as the Directed Reading Activity, and study strategies, such as SQ3R, that are applicable to all content areas. After providing some teaching strategies to help students develop their reading vocabularies, teachers in specific content areas are given suggestions for teaching comprehension skills. These suggestions reflect the levels of cognition described by Bloom (1956) in

his Taxonomy of Educational Objectives. Smith, et al. (1978) coined the term "bookthinking" to describe the approach he recommends in Teaching Reading in Secondary School Content Subjects: A Bookthinking Process. Bookthinking refers to "the way a mature reader interacts with a printed message." (p. 5) To promote "bookthinking" behavior, Smith recommends that secondary content-area teachers match students with appropriate books by evaluating classroom materials and the reading abilities and interests of students. Strategies for vocabulary development and for teaching comprehension and study skills that could be generally applied to all content areas are described. Teachers are urged to help students achieve active involvement in the reading process by encouraging positive reading habits, teaching reading strategies, and helping students select meaningful material.

Comprehensive High School Reading Methods, (Sheperd, 1973) provides a detailed description of the relationship between reading and learning in the content area class. Methods for diagnosing reading problems in the classroom using a variety of formal and informal methods are described early in the text. Along with activities for vocabulary development in all content areas, methods for helping students relate new terms and concepts to known experiences are included. Sheperd also stresses that wide reading is one of the most effective ways to improve vocabulary. Teachers are encouraged to develop questions pertinent to the four levels of comprehension skills (literal, interpretative, critical, and creative) which are described. Included in a discussion of typical comprehension problems

such as the inability to determine the central thought of a paragraph and to set a purpose for reading, are a number of activities designed to help solve these problems. Following the section on comprehension, a variety of reading study techniques and some suggestions for individualizing instruction in content area classes are described. The concluding chapters contain suggestions for applying reading skills to specific content areas.

Teaching Reading and Study Strategies, (Robinson, 1978), begins with a discussion of the characteristics of today's youth. According to Robinson, these youth face an uncertain future and are confronted with new knowledge at a rapid pace. Robinson states that, "the major goal of secondary schools must change from that of disseminating knowledge to emphasis on developing learners who can unlock ideas independently." (p. 15) Teaching Reading and Study Strategies includes descriptions of several techniques for evaluating student reading strengths and weaknesses, and for teaching vocabulary, comprehension, and study skills. The major portion of the text is devoted to describing the writing patterns common to specific content areas. Teachers are shown how they can help students read these patterns more effectively.

Secondary School Reading: Process, Program, Procedures, (Hill, 1979), represents a comprehensive approach to reading instruction at the secondary level. Reading is defined as a process of receptional communication involving purposeful personal behavior. According to Hill, reading can most effectively be taught through a program that

includes systematic evaluation, developmental/corrective reading classes, guidance in content area reading, guided independent reading, and special services for pupils with special reading needs. The following eight fundamental strategies for improving content reading are described in detail:

1. Identifying pupil reading performance characteristics;
2. Facilitating the use of classroom sources;
3. Coordinating the reading of sources: unit study;
4. Improving the reading assignment;
5. Guiding the reading of text;
6. Developing class-related specific reading behaviors;
7. Extending independent content reading habits and interests; and
8. Adapting content instruction for poorer readers.

Succeeding chapters explain how content area teachers might employ these strategies. Following these chapters on content reading are descriptions of how reading instruction should be executed in developmental and corrective reading classes. The concluding chapters of Secondary School Reading: Process, Program, Procedures are directed toward aiding the different reader and implementing the comprehensive program.

General suggestions for teaching reading in the content areas. The Journal of Reading is the primary source for articles dealing with reading instruction at the postelementary level, although a new publication, Reading Horizons, contains several articles on

this topic. The primary purpose of many of these articles is to encourage content area teachers to teach reading. According to Palmer (1975), it is essential that content teachers realize, "reading competence is best achieved when the student's focus is on the content of the material and not on reading itself." (p. 44) Palmer then explains that content teachers do not need extensive training in phonics in order to teach the reading skills pertinent to these courses. Palmer also encourages content teachers to build reading instruction around the key concepts and study skills needed for their courses, rather than rely on prepackaged reading materials and devices such as reading rate builders.

Based on the results of a survey of 34 high school content teachers, Riech (1977) concluded that content teachers may convey a negative attitude toward reading by not encouraging students to read and by not requiring students to account for reading assignments. Riech also surveyed the students of some of these teachers. Ninty-eight percent of these students indicated that the tests is their courses covered lecture and discussion rather than reading assigments. Only 5% of the students indicated that their teachers gave them a purpose for reading and 33% believed that their teachers did not like to read.

Clary (1978) urges content teachers to teach reading in their classes and then explains how the language experience approach and the individualized reading approach can be modified for teaching reading in the content areas. Shuman (1978) describes strategies

for teaching specialized vocabulary and for determining the readability of materials used by content area teachers. Shuman also stresses the importance of administrative support for secondary reading programs. Macklin (1978) maintains that content teachers should help their students gain personal meaning from the material they read. According to Macklin, the content area teacher can help students gain this meaning through prereading activities and guidance during reading. Burmeister (1976) suggests that content teachers can aid their students' vocabulary development by teaching the morphemes (the smallest unit of meaning in language) that are common to a particular subject area. For example students in social studies would be taught that words such as autocracy, autography, and automat have "auto" as a base. Hansell (1976) describes how prereading activities can be used by content teachers to help students cope with difficult material. In addition to urging content teachers to teach reading, Bullerman and Franco (1975) and Crisculo (1976) describe several model postelementary reading programs currently in operation. Wolfe (1978) recommends that a successful postelementary reading program should be based on comprehensively developed curriculum for K-12 students. According to Wolfe, elementary teachers have much to offer teachers in the upper grades. For this reason Wolfe stresses that communication among K-12 teachers is essential. Peters (1977) discusses the need for a comprehensive reading program at the secondary level. Although Peters believes reading in the content areas is important, he maintains that the ideas, strategies, and approaches

that make up a school's remedial, developmental, and content area programs should be synthesized. Peters includes a model of a comprehensive secondary reading program and describes the roles of content teachers, reading staff members, and support staff members within this program.

Estes and Staiger (1973) provide an overview of an International Reading Association project called Consortium of Professional Associations for the Study of Special Teacher Improvement Programs (CONPASS). The goals of this project were to:

1. Disseminate knowledge about methods and materials for teaching reading within various disciplines in secondary schools.

2. Improve students' achievement in English, social studies, mathematics and science.

3. Demonstrate teaching methods and materials appropriate to increase students' achievement in these disciplines.

4. Change teaching strategies in college methods courses such that they serve as models for appropriate instruction at the secondary level.

5. Apply in liberal arts courses the same methods and materials deemed appropriate and useful in like disciplines in secondary schools.

6. Bring about greater cooperation among personnel in liberal arts, colleges of education and public schools. (p. 521)

For the purposes of project CONPASS, teams consisting of university and public school personnel developed and held workshops and training sessions designed to change teacher behavior in the reading aspect

of content teaching. No data were reported concerning the effectiveness of these workshops and training sessions; but the specific suggestions for teaching reading in the content areas of English, science, social studies, and math were published in professional reading journals for wider dissemination.

Several articles in the Journal of Reading describe how content area teachers can assess the readability of their classroom materials. Some articles also explain how teachers can adapt materials that are judged to be difficult. Strange and Allington (1977) describe several methods for teaching difficult vocabulary and suggest that paragraphs should be analyzed for three factors: importance to the reading goal, syntax, and vocabulary. If a paragraph is difficult syntactically and not important to the reading goal, Strange and Allington suggest that the paragraph should be eliminated from the reading assignment. According to Strange and Allington, teachers should provide assistance in the form of study guides and prelesson vocabulary/concept introduction for important but difficult paragraphs. Harker (1977) explains that content teachers should evaluate materials on the basis of concept load, background information required, organization, format, and style in addition to using readability formulas like the Fry. Nelson (1978) also offers some suggestions for evaluating the readability of content area material. According to Nelson content area teachers should:

1. Learn to use a simple readability formula

2. Provide text material containing essential content at varying readability levels

3. Not assume that matching readability level of material to reading achievement level of students results in automatic comprehension

4. Not assume that rewriting text materials according to readability criteria results in automatic reading ease

5. Recognize that the best way to enhance reading comprehension is to provide the kind of instruction which prepares students for the reading assignment. (p. 625)

Ball (1976) offers a set of standards for selecting reading resource materials in the content areas. Krause (1976) describes how to use the SMOG readability calculations and presents a list of considerations in addition to readability formulas for evaluating content textbooks.

According to Shuman (1978) the textbooks in most content areas present little difficulty for average and above average readers. He also maintains that content area teachers are able to incorporate reading instruction into their courses for average and above average readers with little assistance from specialized reading staff. However, Shuman states that "the secondary teacher is generally ill-prepared and uncommitted in dealing with the problem reader." (p. 602) He then describes how the reading specialist and the content teacher work together to aid poor readers.

Instructional suggestions for social studies. One of the earliest descriptions of reading skills for the social studies was published in 1953. In an article in the Reading Teacher, Sochor identified

specific skills basic to reading and understanding social studies materials. Sochor emphasized that not only was it necessary to build an adequate reading vocabulary in each content area, but "the reading ability of every student should be appraised in each content field with materials taken from that field." (p. 357)

Ten years after Sochor's article appeared, Nowell (1963) offered suggestions on developing concepts in the social sciences. Understanding concepts, indicated Nowell, necessitates understanding a highly technical vocabulary. In developing the students' vocabulary, the social science teacher must consider the range of ability of the students and, for all assignments made, the reading level, the concept load, and the concept level of the materials. In addition, for understanding to occur, the social science teacher must make the concepts and vocabulary relevant to the experience of the student.

Palmer (1973) discussed reading skills (e.g., recalling, comprehending, interpreting, concluding) as broader "mental operations" that must not be separated out solely for reading, but instead must be considered in their totality for the individual student. All of these "mental operations" play a role in developing an understanding of social science concepts. An eclectic approach with an emphasis on language activities, Palmer indicated, should motivate the students and help them use all their "mental operations" to develop an understanding of concepts.

The motivation of students and the development of concepts were identified for discussion separately by Sartain (1973) and

and Thompson and Morgan (1978). To make students enthusiastic about reading, Sartain urged social studies teachers to break away from a "pedantically subject-centered approach to secondary teaching and adopt a purposeful project involvement approach." (p. 48) Among the projects that would motivate students Sartain included debates on current issues and community surveys supplemented with related historical and economic information. Thompson and Morgan (1978) indicated that the most common purpose for requiring reading was for the "acquisition, storage and retrieval of what we believe to be essential information." (p. 132) They offered a sample "concept formation study guide" as one means of prompting students to extract the key concepts and main ideas from materials they are assigned to read.

Frankel (1974) demonstrated ways in which social science content could be combined with critical reading and communication skills to enhance the learning content. Frankel's students were required to use primary and secondary sources, as well as a variety of media, to obtain information as a basis for writing a book, building a game, or designing an environmental impact study.

Using reading skills as their observable criteria Kratzner and Mannies (1979) devised a four-phase program of diagnosis, instruction, practice, and application, to develop affective objectives in the social studies. They found their approach motivated the students to explore new areas and, in so doing, to gain confidence as independent researchers. Reading educators emphasize many of the same aspects of reading in social studies as do social studies educators.

These include helping students learn the necessary vocabulary, understand complex concepts, as well as encourage students to become actively involved in reading social studies material.

Instructional suggestions for English. Perhaps because reading-related articles are readily published in professional English education journals and because English educators are often also reading educators, only a few English-related articles appear in professional reading education journals. Chesler (1976) describes how the teaching of reading and the teaching of poetry can be integrated. Because students often find that poetry is the most difficult genre to read, Chesler suggests that teachers choose poems students can understand at a literal level, can connect to a personal experience, and that appeal both visually and auditorily to students. Then Chesler describes the process he developed for the simultaneous study of a poem and teaching three basic reading skills: surveying, reading for literal meaning, and reading for critical meaning. O'Brien and Schwarzburg (1977) describe a strategy for improving teenagers' understanding and appreciation of poetry. O'Brien and Schwarzburg recommend that teachers organize study guides that develop comprehension at literal, interpretive, and applied levels. According to O'Brien and Schwarzburg these guides can be used to provide structure for discussing poetry in small groups. Manzo (1973) summarizes the results of the CONPASS (see p. 34) English project which developed a number of comprehensive activities for teaching the reading-related aspects of English. First Manzo lists and briefly describes a number

of activities designed to improve reading comprehension through writing. According to Manzo, the motivation to write requires the reader to synthesize what has been read. Manzo then describes how the library staff can organize and direct independent reading/study projects for students. Suggestions for using advance organizers for book length material, a number of variations of reading guides, a technique designed to help students set purposes for reading, and several thematic English/reading units also resulted from the English CONPASS project. The suggestions offered for teaching reading skills necessary for effective reading materials in the English class are similar to suggestions made by content educators in professional English journals. This similarity is not surprising because many reading educators are English educators and vice versa.

Instructional suggestions for science. Thelen (1976) describes in detail a number of procedures for integrating reading instruction into the science class. According to Thelen reading instruction can best be facilitated when science teachers or content specialists combine their efforts with reading teachers or process specialists. Thelen then recommends that science and reading teachers do the following to improve reading instruction:

1. Evaluate both the reading materials and the students' reading abilities

2. Develop and use prereading activities to cognitively prepare students for new material

3. Provide study guides for student use while reading

4. Develop additional activities for the reinforcement of vocabulary and comprehension skills

5. Develop techniques and procedures to evaluate classroom learning, teaching, and materials.

Unlike science educators (p. 21) who emphasize analyzing and rewriting science material, a reading educator writing about reading in the science class stresses study aids that can be used with intact text.

Instructional suggestions for mathematics. Hollander (1977) believes that mathematics teachers are not well prepared to teach math-related reading skills. According to Hollander, math teachers too often focus on details in the text rather than on helping students to see relationships among ideas. Although mathematics teachers should teach students the meaning of specialized vocabulary, Hollander maintains that this type of oral instruction defeats the purpose of the text as a supplement to the classroom presentation. Hollander states that often mathematics teachers, "avoid use of the texts instead of teaching students how to cope with them." (p. 10) Hollander then presents several methods that could be used to help students read mathematics material: (a) have students discuss the expository material and verbal problems they have read, (b) have students read the material and indicate in the margins the terms they do not understand, (c) develop prereading activities for material that is important to the understanding of concepts and vocabulary.

Lees (1976) provides some specific suggestions for what he calls a systematic approach to dealing with reading problems in

mathematics. Lees first expresses the notion that mathematical writing is very compact and therefore should be read in a deliberate fashion. Lees then suggests that mathematics teachers should analyze materials using standard readability formulas and modifications of the cloze procedure. Lees describes how informal reading inventories can be used to identify students' mathematical reading needs. Following these suggestions for evaluation, Lees describes how study guides and specific study methods can be used to aid comprehension and he urges mathematics teachers to include reading guides and vocabulary aids when mathematics assignments are made.

Maffei (1973) describes how he applied the PQ4R (Preview, Question, Read, Reflect, Rewrite, and Review) study method to mathematical word problems. According to Maffei, the use of PQ4R encourages students to carefully read and reread the problem. Each step in the PQ4R method is designed to emphasize a different aspect of the mathematics question. Riley and Pachtman (1978) describe how to use a reading guide to aid students as they read mathematics word problems. The guide that they recommend consists of statements to which students respond as they read. These statements reflect the three-level construct of comprehension described by Herber and consist of the following: 1) the facts of the problem--the literal comprehension level, 2) the mathematical concepts or ideas underlying the problem--the interpretive level, and 3) the numerical depictions related to the problem--the applied level." (p. 532) Mathematics educators maintain that the dual language systems used in mathematics materials

create reading difficulties for students. Reading educators do not appear to be as concerned with this problem. They place more emphasis on teaching vocabulary and strategies for reading word problems.

Instructional suggestions for vocational-technical education. Young and Rodenborn (1976) maintain that often teachers of vocational education courses ignore the demands for reading and writing skills that their subjects place on students. Focusing in particular on secretarial courses, they describe how teachers can analyze the reading/writing requiremetns of secretarial tasks. Next, Young and Rodenborn recommend that teachers pretest to assess student competence in the tasks analyzed. They then describe specific activities designed to instruct students who do not possess the needed reading/writing skills. Johnston (1974) suggests that the reading teacher and the cosmetology teacher jointly analyze cosmetology material to determine the specific reading skills required. According to Johnston two specific skills might be locating needed details about products and techniques quickly, and learning unfamiliar scientific vocabulary. Johnston then presents some teaching strategies designed to teach these two skills. According to Kelly (1975) the common way of dealing with students having reading deficiencies is to tutor these students using commercial kits and materials. But Kelly believes this procedure is ineffective in the vocational setting, because improving reading performance is secondary to helping students reach course objectives that would make them more employable. To better meet the needs of students with reading deficiencies in the vocational

classroom, Kelly designed a procedure where the reading coordinator worked with students and teachers within the course context. In this program the reading coordinator assisted the vocational faculty by:

1. Diagnosing student reading needs
2. Determining through discussion the types of problems teachers had in dealing with poor readers
3. Assessing the readability of material
4. Presenting lessons on reading skills in the vocational classroom
5. Relating the content and concept areas of the vocational curriculum to academic areas such as English and social studies
6. Tutoring students with special needs
7. Developing a reading resource center.

Though reading educators have published few articles relating to reading instruction in vocational-technical education, those articles that do appear in professional reading journals stress a close working relationship between the vocational-technical teacher and the reading specialist.

III

Evaluations of Postelementary Reading Programs and Practices

The preceding review shows that both content and reading educators have been involved in teaching reading at the postelementary level during the past 10 to 20 years. Although some of this postelementary reading activity has been in the form of developmental and corrective reading classes, there is evidence that content and reading educators have directed their efforts toward developmental programs taught through content area courses. Yet, in spite of this effort, many educators maintain that content area reading instruction has not been effectively implemented at the postelementary level.

Early, who also reviewed secondary reading programs in 1960 and 1969, drew the following conclusions in her 1973 review:

> In the past thiry years, the status of reading instruction in the secondary school has changed very little. In 1972 as in 1942, we are still debating the merits of special reading services and urging the whole school faculty to teach reading in the content fields.
>
> If I were to write in any detail about how to teach reading in the content fields, I would repeat much that was said well in 1946 when the first edition of Strang, McCullough and Traxler appeared...
>
> In spite of the steady increase in professional books and courses in secondary reading, in spite of the Journal of Reading and increased attention to the high school level at national and local reading conferences, only very limited progress has been made in extending reading instruction to the twelfth grade. It is the exceptional school system that offers courses in reading and study skills beyond eighth grade. Only in rare instances do I find high school departments other than English demanding teachers who are skilled in teaching reading.
>
> (p. 364)

Hill's 1971 review of 25 surveys of secondary reading activity published between 1942 and 1970 (cited earlier, p. 7) included summaries of content area reading programs. In his introductory comments on secondary reading instruction prior to 1940, Hill speculated that perhaps secondary teachers provided more incidental help with language and learning processes before the days of highly specialized secondary teaching fields and large classes. After closely examining the characteristics of secondary reading programs surveyed, the following summarize Hill's observations about content area reading instruction between 1942 and 1970:

> Few of the schools surveyed reported comprehensive reading programs that included developmental/corrective classes and content area programs.
>
> Though content area teachers were aware of their students' reading deficiencies, they did not want to be personally responsible for providing help to these students.
>
> Inservice programs typical of the period between 1960 and 1970 were not effective in improving reading instruction in content courses.

Hill (1975) reported a survey of reading activity in the western New York region (cited earlier, p. 8). The results of this survey showed that 41% of the schools reported content-oriented programs; however, approximately 75% reported some type of reading class. Similar to the observations he made in his 1971 review, Hill (1975) concluded that, "There is little evidence of a vigorous comprehensive thrust toward reading development in these schools." (p. 19)

Freed (1972) reports the results of a survey of the reading programs in 242 school districts across the nation (cited earlier, p. 8). According to Freed, only 5% of the schools surveyed reported a course described as "reading in the content areas." In the same report, Freed summarizes the responses of 41 of the 50 state departments of education to questions about t'.ir specific requirements for the teaching of reading. When asked if there was a state requirement for a minimum number of hours per week to be spent in classroom time devoted to reading instruction, 90% (37) of the state departments reported no for the junior high level, while 98% (40) reported no for the senior high level.

In addition to the surveys and reports of Early, Hill, and Freed, there are other indications that reading instruction has not been effectively incorporated into content area courses. Braam and Roehm (1964) conducted a limited survey of subject-area teacher's familiarity with reading skills. They found that the teachers surveyed were not familiar with the skills described by reading professionals as necessary for successful reading in subject matter areas, nor were they aware of the reading strengths and weaknesses of their students. Based on the results of this study Braam and Roehm made the assumption that if teachers do not have a sound knowledge of the reading skills necessary for successful reading of subject matter material, they will not be able to teach students to effectively read such material. Braam and Walker (1973) conducted an investigation similar to the Braam and Roehm (1964) study and found that

the teachers surveyed in 1973 had no greater awareness of reading skills than those surveyed in 1964. The results of the Braam and Walker study are supported by and partially explained by Morrison and Austin (1977) who conducted a follow-up study on recommendations made to teacher colleges and universities by Austin and others in 1961. One recommendation was that a course in basic reading instruction should be required of all prospective secondary teachers. Morrison and Austin found that, of the teacher training institutions responding, only 24.8% reported the recommendation had been put into effect while 48.4% reported it had not been. Another 14.9% reported the implementation of a modified version of the recommendations, e.g., the requirement of a course in basic reading instruction for all English and social studies teachers. It would appear that teacher training institutions are not emphasizing the need for postelementary teachers to understand the teaching of the reading process.

In the survey of state departments of education Freed (1972) asked about certification requirements for secondary reading teachers and English teachers. Fifty-one percent (21) of the responding state departments reported they had no special requirements for certification as a secondary reading teacher, while 83% (34) indicated they do not set a minimum number of courses in reading as part of their certification for secondary school English teachers. Only one state had "just passed legislation requiring all new secondary teachers to have a course in . 'ing instruction as part of their preservice experience." (p. 7)

Estes and Piercey (1973) reported that of the 50 states, only 5 required all teachers to be trained in the teaching of reading, while 1 required such training for English and social studies teachers and an additional 3 required it for English teachers only. At that time an additional 8 states were considering making such a requirement prior to certification. So, as of 1973, only 17 states (34%) were concerned enough with the reading skill development of their students to have or to be considering some training for their prospective teachers in reading instruction. An update of these figures was offered by Bader (1975) who reported that for temporary certification some training in the teaching of reading was required in 14 states and under consideration in another 8. For permanent certification, such training was required in 17 states and under consideration in another 8. This means an increase in the 2-year period, from 1973 to 1975, from 34% to about 50%. It is interesting to note, however, that as of 1975, only 9 of the states requiring training in reading for permanent certification were requiring it for teachers in all areas. That number (9) is almost double what Estes and Piercey reported in 1973, but it was still only 18% of the 50 states!

Smith and Otto (1969) investigated junior and senior high school teachers attitudes toward teaching reading in the content areas and found that though teachers were willing to teach reading skills pertinent to their content fields, they did not believe themselves qualified to do so. In support of this, Freed, (1972) reported that personnel in school districts believe that among the most

neglected areas of the secondary reading program are teacher training, reading in the content areas, and study skills. Freed solicited suggestions that would contribute to the development of a new secondary reading program:

> Teacher training: in-service courses; guidance and support for content area teachers, particularly in the study skills (i.e., help from reading specialists, manuals, materials; pre-service to assure more qualified teachers).
>
> Reading in the content areas: incorporation of study skills instruction into various content fields; interdisciplinary materials; team approaches.
>
> Study skills: application in content areas; emphasis on rate, comprehension, research, organization, critical reading; skills for all types of reading. (p. 18)

Artley (1965) also pointed out the need for more teacher training in the area of reading in the content areas and study skills, but in addition, he stressed the need for trained leaders who would assume the responsiblity for organizing and conducting reading programs at the secondary level. Burgett (1976) also recognized the need for trained leaders to implement the reading program at the secondary level when he described the difficulties many reading specialists have in enlisting the cooperation of content area teachers.

Some progress has been made toward training content teachers to teach reading as the reports of Bader (1975) and Estes and Piercey (1973) show. In addition, reading educators such as Burgett (1976), Burgy (1974), Garry (1974), and Sanacore (1979) have directed effort toward training reading specialists to become effective leaders in

the postelementary reading program. Yet Owoc (1979), editor of Reporting on Reading, a publication of the National Right to Read Effort, suggests that many reading specialists have not been able to develop content-centered reading programs. Although Owoc indicates that there are successful programs and cites the program in School District II, The Bronx, New York as an example, he stresses that such programs are not easy to develop and require long-term commitment to staff development. Owoc does not provide a plan for such long-term staff development. He only indicates that content area reading programs should treat reading as a unified process and avoid, "anything that imposes on content teachers the philosophy or methods or materials which characterize the direct reading instruction that occurs in most reading classes." (p. 3)

This review began by examining the research literature concerning the preceived decline of reading achievement in the nation's postelementary schools. The conclusions of a number of investigations suggested that this decline was due to changes, such as increased retention of low ability students, in the population of postelementary schools. Then an extensive search of the reading instruction literature was summarized to gain a perspective on the kinds of programs, methods, and activities that both reading and content educators use to teach reading at the postelementary level. The purpose of this review was to determine what has been done about reading instruction at the postelementary level and to evaluate the effectiveness of current programs and procedures. The following suggestions for improvement of postelementary reading instruction are based on this review and evaluation.

IV

Suggestions for Effective Content Area Reading Programs

One could not argue with Owoc's (1979) contention that a long-term commitment to staff development is essential to the effective development of content area reading programs. But the actual implementation of the staff development effort raises a number of issues and related questions:

How Should the Staff Development be Organized?

According to Hill (1971), Early (1973), and Peters (1977), reading programs at the post-elementary level should be comprehensive in nature. Each teacher should be aware of the types of reading skills required by teachers in other subject areas and grade levels in order to take advantage of and reinforce prior instruction. The reading support staff should play key roles in making communication between content area teachers easier. The types of skills and strategies taught in special reading classes should be readily applicable to content area courses. The requirements of a comprehensive reading program imply that the entire school staff of a school, and ideally the entire K-12 school district, should be involved in the staff development program. But it is important to note that reading educators such as Draba (1975) and Moburg (1972) suggest that the group size for a particular inservice program should be limited to encourage active participation. In addition, content educators such as Kelly (1975) maintain that the reading specialist can most effectively

aid the content teacher by working with teachers and students during the class session. A comprehensive reading program requires commitment on the part of the entire school staff. We believe that staff development should be an on-going process which does not stop when inservice programs have ended. Provisions should be made to insure carry-over between inservice programs and day-to-day school activities.

When Should Time be Allotted to Staff Development?

Reading educators, such as Axelrod (1975), Draba (1975), and Moburg (1972), emphatically state that reading inservice programs should not be held after school, but rather during released time so teachers can attend. However, Kelly's (1975) example of a reading specialist working with content teachers during class time is one of many showing that much staff development does take place during actual school hours. It would be erroneous to believe that all phases of staff development take place during formal inservice sessions. Based on these suggestions, we recommend that reading inservice programs be carried out during released time periods. We also encourage reading specialists to develop the kinds of relationships that would enable them to work with content teachers during the regular school day.

What is Appropriate Content for Staff Development Programs?

Some reading educators, such as Estes and Vaughan (1978), present general reading and study strategies that are applicable across all subject areas, while others, such as Robinson (1978), describe strategies appropriate to particular content areas. There

appears to be no one best way to present reading and study strategies to content area teachers. Perhaps a more important issue pointed out by Draba (1975) is that content area teachers should be involved in planning the inservice program. This planning, according to Draba, could take the form of helping content teachers identify specific reading-related problems and set realistic goals for seeking solutions to these problems.

Early (1973) points out that an important reason for involving teachers in planning content area reading programs is that both students and teachers have changed during the last 10 to 20 years and continue to change. The teaching of reading has improved in the primary grades and secondary teachers are faced with students who know how to read but choose not to. Early believes that today's students rely more on insight and induction than on careful reading to reach conclusions. She indicates that too often students see assignments and lessons from commercial materials only as so much work to get done, not as learning experiences.

In summary, Early (1973) suggests that an important goal for reading programs at the secondary level should be to motivate students to find meaningful reasons for reading. She also describes ways in which teachers have changed. First teachers today are more aware that their students cannot read adequately. Therefore, today's teachers often circumvent the textbook through lectures, simulations, or lab exercises. An important function of the reading program at the postelementary level would be to provide content teachers with

methods and strategies that would encourage students to learn from textual materials. Second, Early points out that many teachers today use multiple texts and independent study and project methods; the study guides and the directed reading lesson which worked well when one text was used are no longer adequate. Content teachers must be directly involved in creating the reading and study aids most appropriate for the kind of course they teach and the kinds of materials they use.

What appears to be needed to accomplish the necessary improvement of reading instruction at the postelementary level is a systematic staff development program that addresses the unique requirements of particular content area courses and, at the same time, melds these different facets into a comprehensive program. This project is currently developing such a program using the information and insights gained from this review, as well as the results of a survey conducted to assess the reading skills content teachers believe are important for their courses.

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